



**United States Army Logistics Transformation Agency**

# **Common Logistics Operating Environment**

**Information Briefing For:  
PM AIT**

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## What is CLOE?

- ❑ CLOE Is The G-4's Program For Synchronizing Doctrine And Technology For Logistics Modernization
- ❑ CLOE Is CASCOM's Agent For Requirements Determination For Sustainment Business Processes For Embedded Health Management and Condition-Based Maintenance
- ❑ CLOE Is The G-6 Designated Logistics Domain Proponent For Sustainment Architecture
- ❑ CLOE Is The Operational and Technical Architecture Modeled Into The Single Army Logistics Enterprise (SALE) For Enterprise Integration
- ❑ CLOE Is an Architecture At Any Point In Time That Enables Sustainment Interoperability For A Composite Force Structure Comprised Of Current And Future Forces



# CLOE Missions

## G-4 Focus Areas For The Current Force

### ■ **“CONNECT” OUR LOGISTICIANS**

- Agile, Assured, 24 / 7 Data Capability into the Enterprise
- Plug / Un-plug as Required
- Enable “Sense and Respond” Logistics
- Include Log, Per, Med & Eng (Operational Sustainment)

### ■ **INTEGRATE THE SUPPLY CHAIN**

- Single Proponent
- Eliminate Stovepipe Sub-optimization

- Ensure Sustainment System Interoperability Among Current And Future Forces
- Ensure Equipment Health Management Provides Data To Support Army-Wide End-End Applications
- Consolidate Army Equipment & Resource Requirements for Equipment Health Management For The Current Force
- Provide Guidance To PMs For Implementing Embedded Health Management And Condition-Based Maintenance (CBM)
- Explore Science And Technology-Enabling Initiatives for Equipment Health Management



## **G4 Focus Areas Supported by CLOE** ***Current & Future Concepts***

**The CLOE approach uses traceable categories, grouped by G-4 Logistics Focus Areas, to identify Focused Logistics Capabilities:**

### ■ **Connect the Logistician**

- Gives the Logistician Near-Real-Time Visibility of Platform Maintenance and Logistics Requirements
- Feeds the LCOP (via BCS3) with Platform Status Information
- Provides The Infrastructure For Sense & Respond Logistics

### ■ **Integrate The Supply Chain**

- Provides Operating Data Needed to Forecast Platform Maintenance Needs and Implement CBM+

### ■ **Modernize Theater Distribution**

- Facilitates In-Theater Awareness of Platform Maintenance & Logistics Status
- Integrates UID Information Into Operational Architecture Business processes

### ■ **Improve Force Reception**

- Predictive Health Management Permits Selection of Task Force Equipment at Readiness Required for Mission



# CLOE Architecture

**Purpose: To provide an orientation on the status of CLOE Program & Architecture development efforts**

**Approach:**

- Program Overview
- Spiral Development Approach
- The CLOE Vision
  - ▶ Principles - (Program banners, focus points, road map)
  - ▶ Objectives - (Provide, Enable, Deliver & Ensure)
  - ▶ Parameters - (Measurability, Constraints)

**This is a  
Work in  
Progress**

**→ Architecture**

- ▶ Purpose - To Describe the Feasibility of Attaining the CLOE Vision under a Specific Set of Circumstances
- ▶ Scope - UA Tactical & Operational Missions
- ▶ Intended Uses & Users
  - ▶ Commander, Crew, Maintainers, Logisticians



## Proactive Collaboration

- Army Staff – Overall Architecture
  - G3, G4, G6, G8, MDEP
- AMC – Technical Architecture
  - ESC (Enterprise Integration / SALE)
  - SASG (Standards, Protocols, Specifications)
- TRADOC – Operational Architecture
  - Architecture Integration Management Division (AIMD)
  - CASCOM ISD (BCS3)
  - DCD-OD (Policy, doctrine, business processes, 2-Level Maintenance)
  - Aviation Center, Signal Center, Ordnance Center
- PEOs – Systems Architecture
  - EIS, GCS, CS&CSS, Aviation
  - Program Managers (TLDD, FBCB2, TWV, MTS, CAISI, Stryker, BCS3)
- TSMs – FBCB2, Stryker, BCS3
- Joint Level
  - J-4 – Focused Logistics Conference
  - Joint Distance Support and Response (JDSR) Program - Agile



## CLOE Functional Areas

- Five highly Interrelated and Interactive Areas:
  - Embedded Health Management
  - Condition-Based Maintenance
  - Anticipatory Logistics
  - Command and Control C2 (Warfighter)
  - Logistics C3 Command, Control, & Computers
- Requires interoperability with other logistics and command information systems
- Requires integration with DoD Logistics Architect





# CLOE's Development Path

## White Paper

- **Signature**
- **High-Level**
- **Basis**

- **Based on Focused Logistics**
- **Compliant with ASA(ALT) Policy Memo**
- **Supports Army Focus Areas**
  - **Current to Future Force**

Measure  
s of  
success

Contains

## **VISION**

Supports

## Principles

- **Key banners for CLOE Vision**
- **Present the focus points**
- **Clear road map**

- **Support G4 Focus Areas**
- **Define the solution parameters**
- **Lay out measures of success**

## Objectives

- **Provide**
- **Enable**
- **Deliver**
- **Ensure**

Determine

## Parameters

- **Specific constraints**

Guidelines

- **Links to sources**

## Supported by:

- **Action Officer Assignments**
- **CLOE IPT/SIL/CCB**
- **CLOE CONOPS**
- **Implementation Plan**
- **CLOE Technical Team SMEs**





## Defining CLOE's Operating Environment

- The CLOE Program represents a unique blend of embedded command, control, and communications (EC3) interfaces and equipment configurations designed to integrate platform-level equipment and consumable status information with the Army's logistics enterprise environment; therefore, it is termed an "operating environment" even though it is not in itself an information system.
- The CLOE operating environment extends to all equipment platforms used in the Future Force, including ground combat, ground support, and watercraft.

**Quoted from  
the CLOE  
Concept  
Paper &  
Strategy**

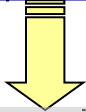


# Spiral Development

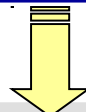
**The CLOE Architecture is an Evolving Environment of Systems Integration and Interoperability**

## STARTING POINT

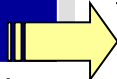
CLOE  
Architecture 1.0  
SBCT



4<sup>th</sup> ID RESET  
v1.1



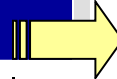
+Aviation  
V2.0



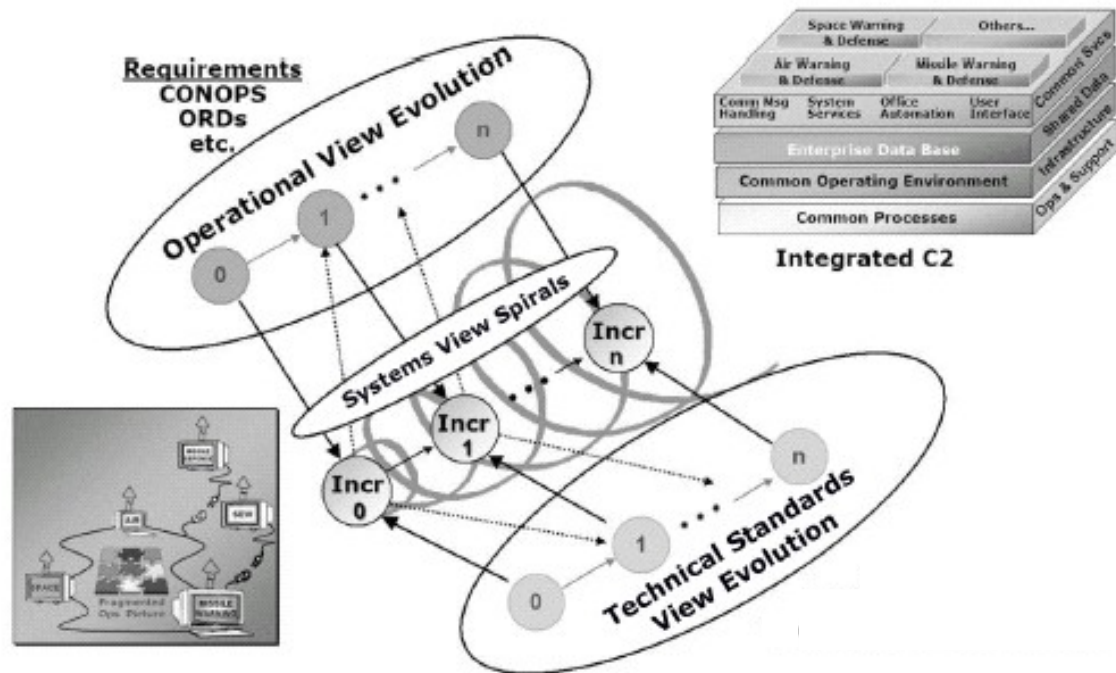
+Soldier  
Systems v3.0



+ Engineer  
& Watercraft  
V4.0



+FCS  
V5.0





# The CLOE Vision

## Linked to the Operational & Technical Architectures Development

### Vision:

“CLOE describes the Army’s vision for developing a technology-enabled force equipped with self-diagnosing equipment platforms that interact with a networked sustainment infrastructure to support condition-based maintenance and accelerate implementation of Future Force processes”.

Quoted from  
the CLOE  
Concept  
Paper &  
Strategy

### Addresses:

- 2-Level Maintenance
- Embedded Diagnostics/Health Management
- Anticipatory Logistics (Supply)
- Battle Command

### Impacts on:

- *Distribution*
- *Ammo*
- *Fuel*
- *Financial Management*
- *Medical*

**Focus on UA Maintenance & Sustainment Capabilities**



# CLOE Vision Drill Down

**Vision:** “Develop a technology-enabled force equipped with self-diagnosing equipment platforms that interact with a networked sustainment infrastructure to support condition-based maintenance and accelerate implementation of Future Force logistics processes”.

## ↓ Principles (6)

Maximize warfighting effectiveness in the Unit of Action (UA)

Provide data for global view of required UA sustainment support

Optimize Communication Processes

Flexibility to adapt to changing technology environment

Streamline the UA logistics footprint

Transform UA maintenance and sustainment operations into an integral component of the Enterprise Integration

## ↓ Objectives (4)

- Commonly defined set of platform data standards

- Provide logistics data to the command and control systems

- Provide timely, accurate & reliable data to support UA sustainment operations

- Ensure equipment health management provides data to support Army-wide end to end data applications

## ↓ Parameters (3)

Real-time

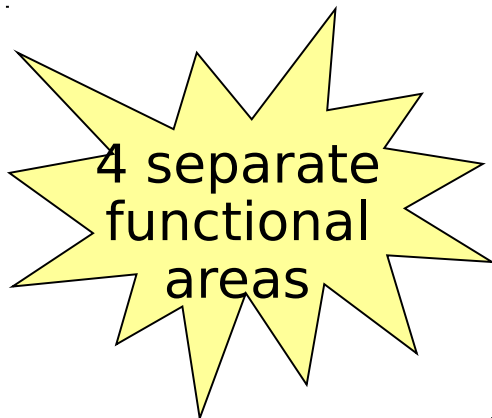
Automated

Interface to BCS3



# CLOE / SALE Alignment

**Mapped into the  
SALE Architecture  
Using ARIS  
Modeling Tool**



**On & Off-Platform  
Processes**

## **Embedded Health Management System**

- Health Status Reporting
- Diagnostic Health Monitoring
- Embedded Diagnostics
- Condition-Based Maintenance

**23 Processes  
identified and  
Mapped**

## **Combat Repair Team/Combat Trains Command Pos**

- Maintenance & Logistics Monitoring & Reporting
- Fuel & Ammo Rollup Reporting Status
- Remote Diagnostics - Platform Troubleshooting
- Condition-Based Maintenance Actions
- Part Requisition
- Work Order Initiation

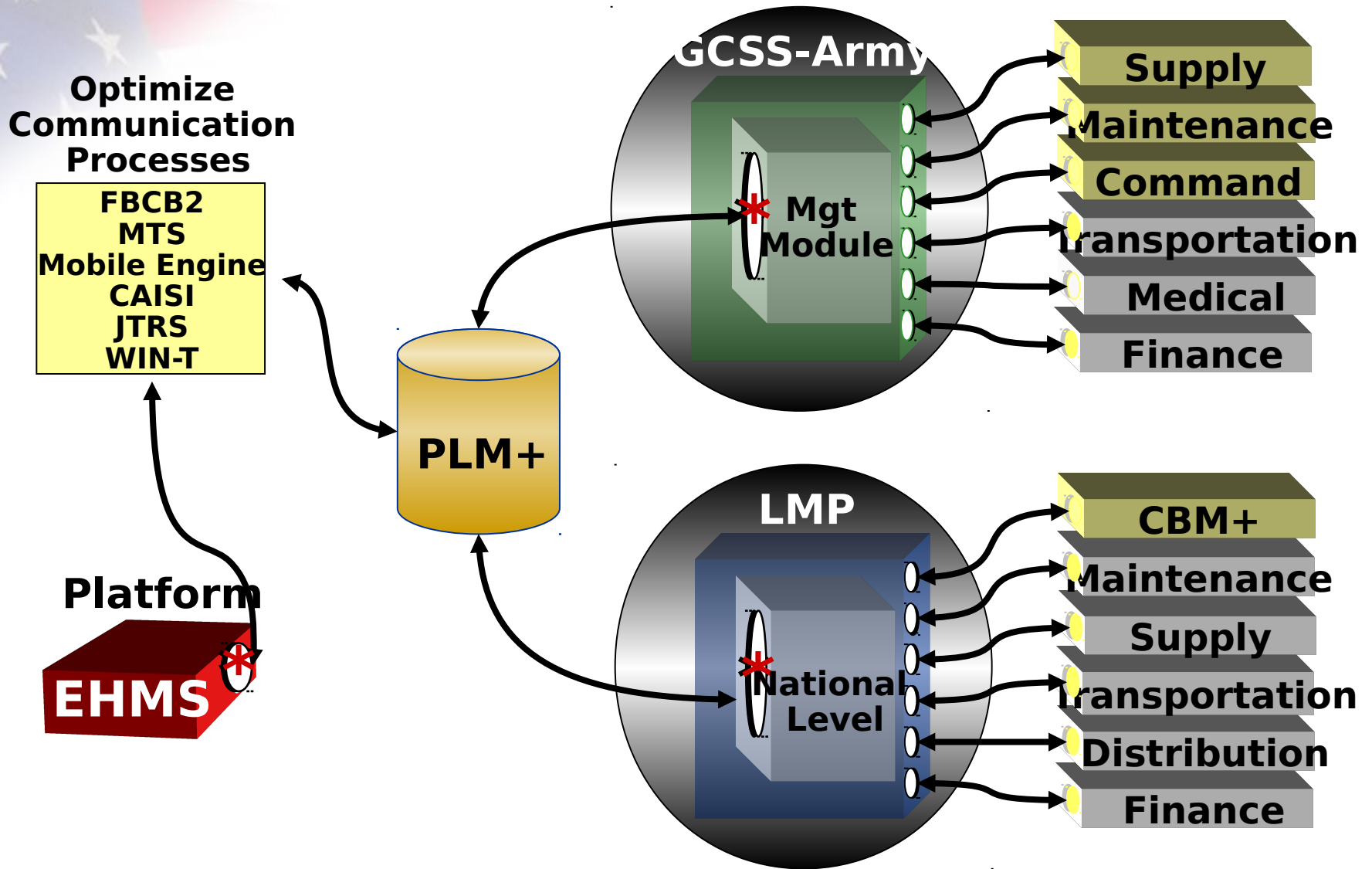
**Platform - 10  
CRT/CTCP - 7  
BSA - 6**

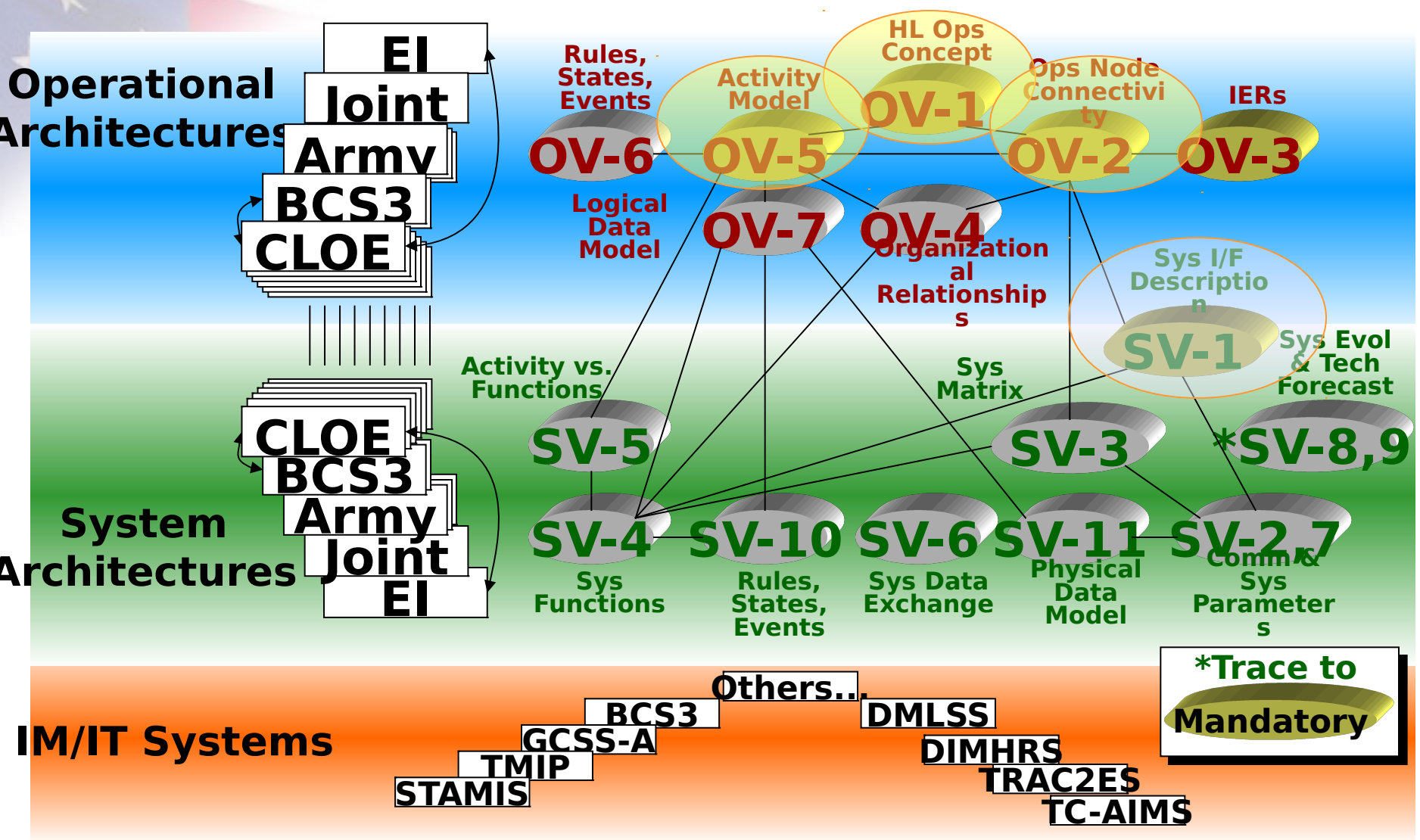
## **Brigade Support Area**

- BDE Tactical Monitoring/Anticipatory Support
- Logistics SA - UA Tactical Common Logistics Operating Picture
- Mission Planning
- Maintenance Support (FMC)



# EI Interface Requirements







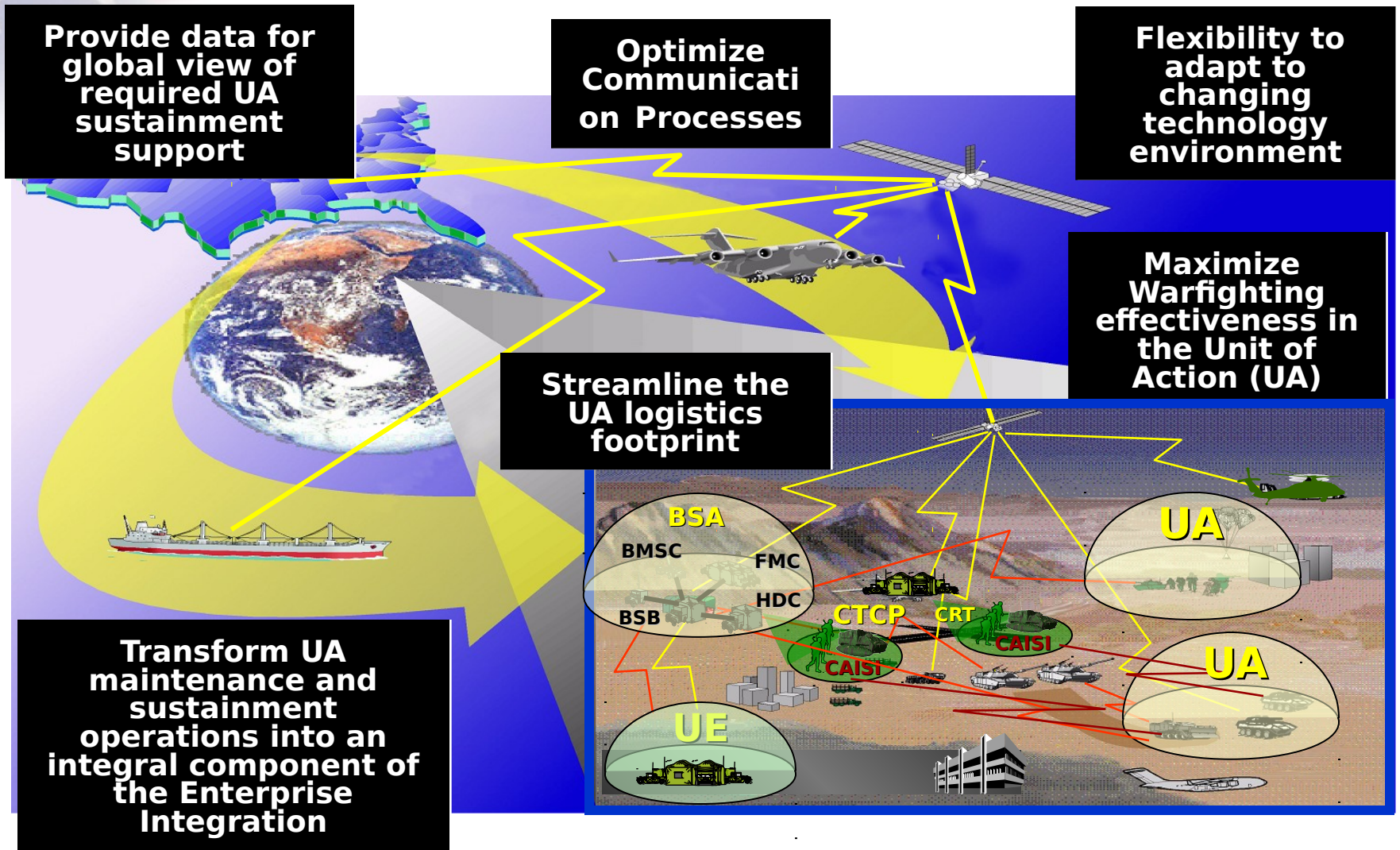


## CLOE OA v1.0 Focus Areas

- **Implementation of an Common UA Tactical Logistics Operating Environment:**
  - Provides a common UA tactical operating picture
  - Provides Commanders significant operational status to build combat power and manage readiness
  - Connects the Logistician to the Platform
  - Supports Army Transformation initiatives
- **Enables vertical and horizontal integration of Platform logistics status by providing automatic feeds to BCS3**
- **Establishes integrated business processes and rules to support embedded health management, condition based maintenance and anticipatory logistics**
- **Leverages current STAMIS processes and systems to the maximum extent possible while evolving to EI**
- **Flexibility to enable and support Future Force & Joint Interoperability requirements and the continual evolution of Warfighting doctrine**



# Operational View - CLOE OV-1

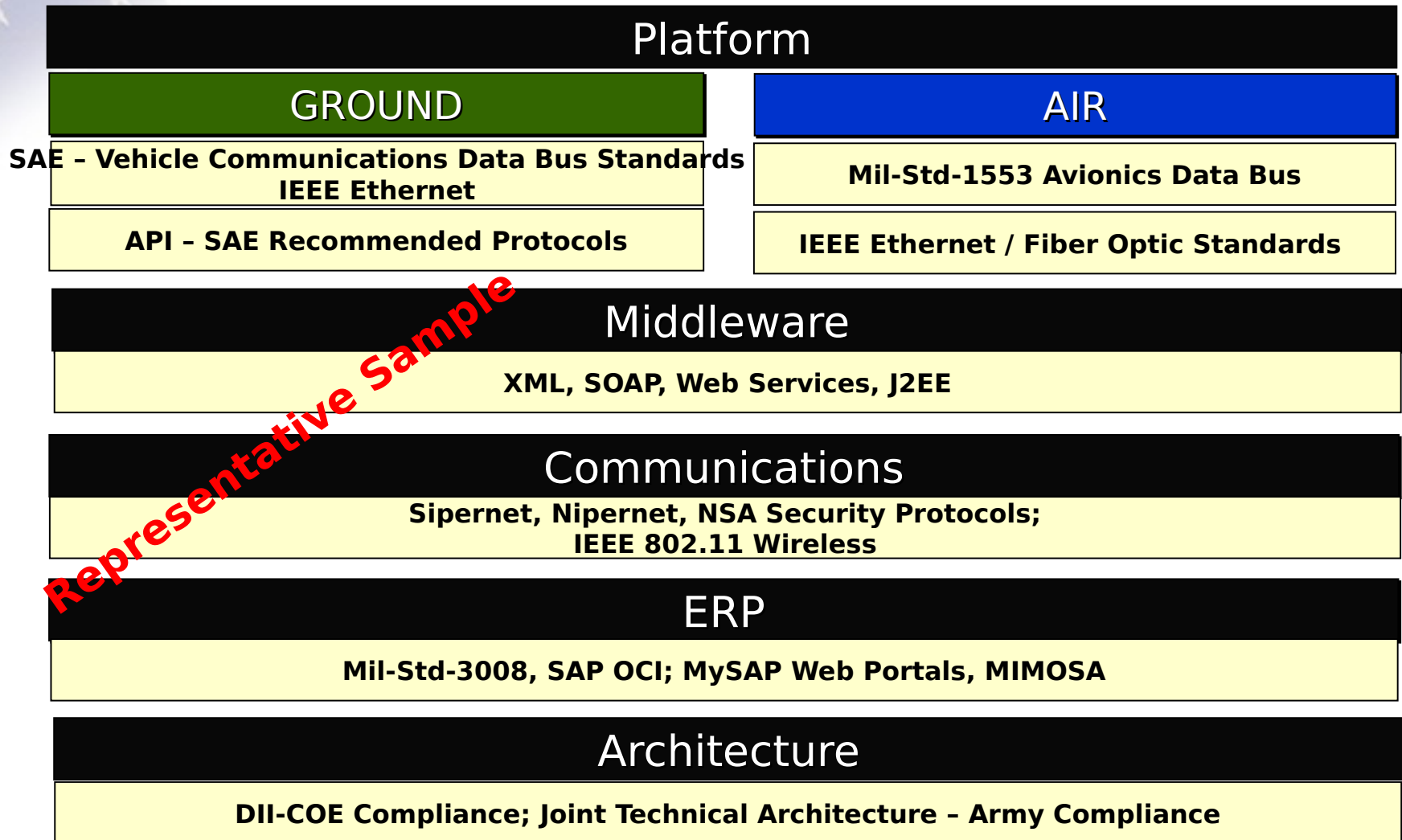






# Technical Architecture

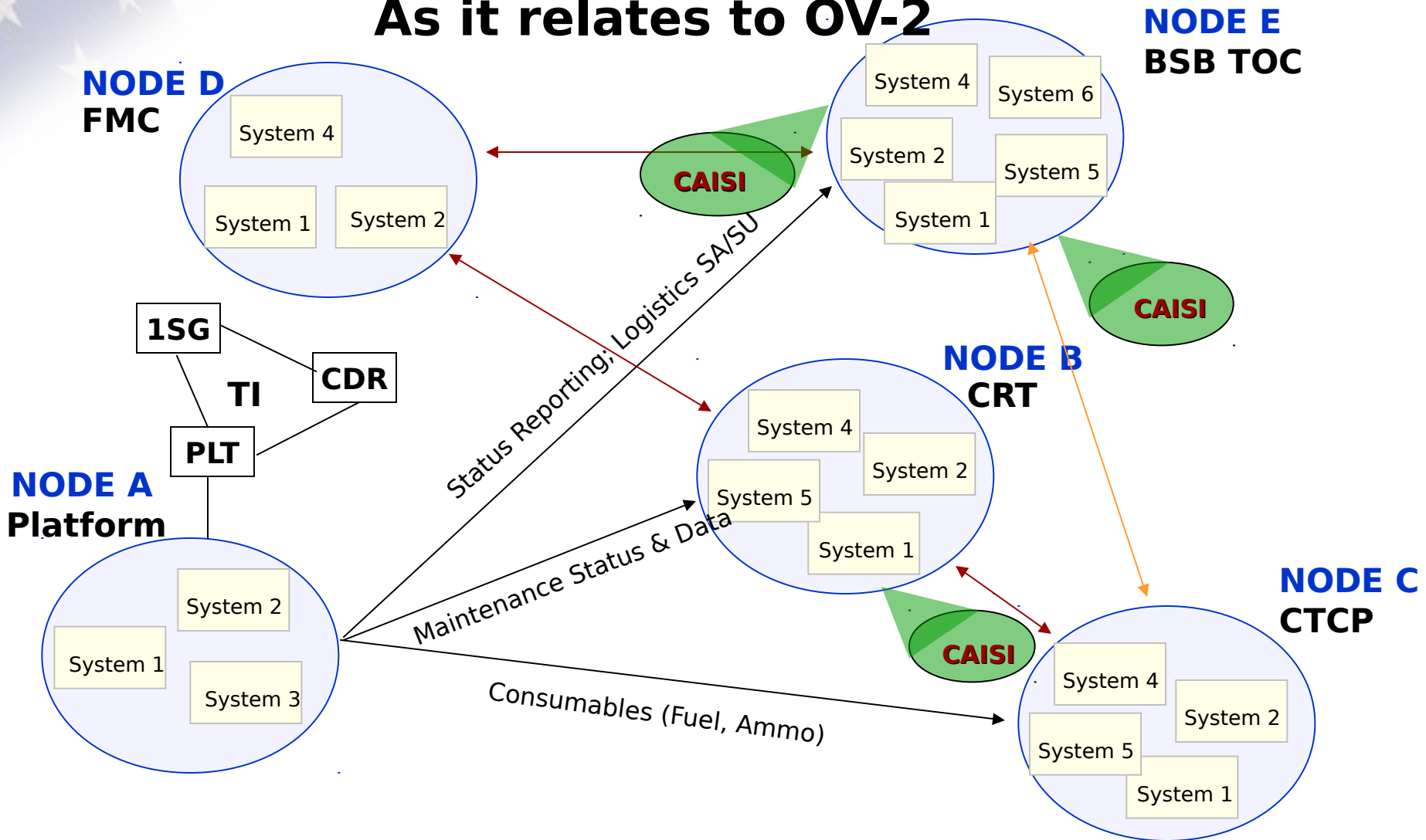
## *Commonality Provides for Interoperability*





# SV-1 System Interface Identification & Functional Description CLOE v1.0

## As it relates to OV-2



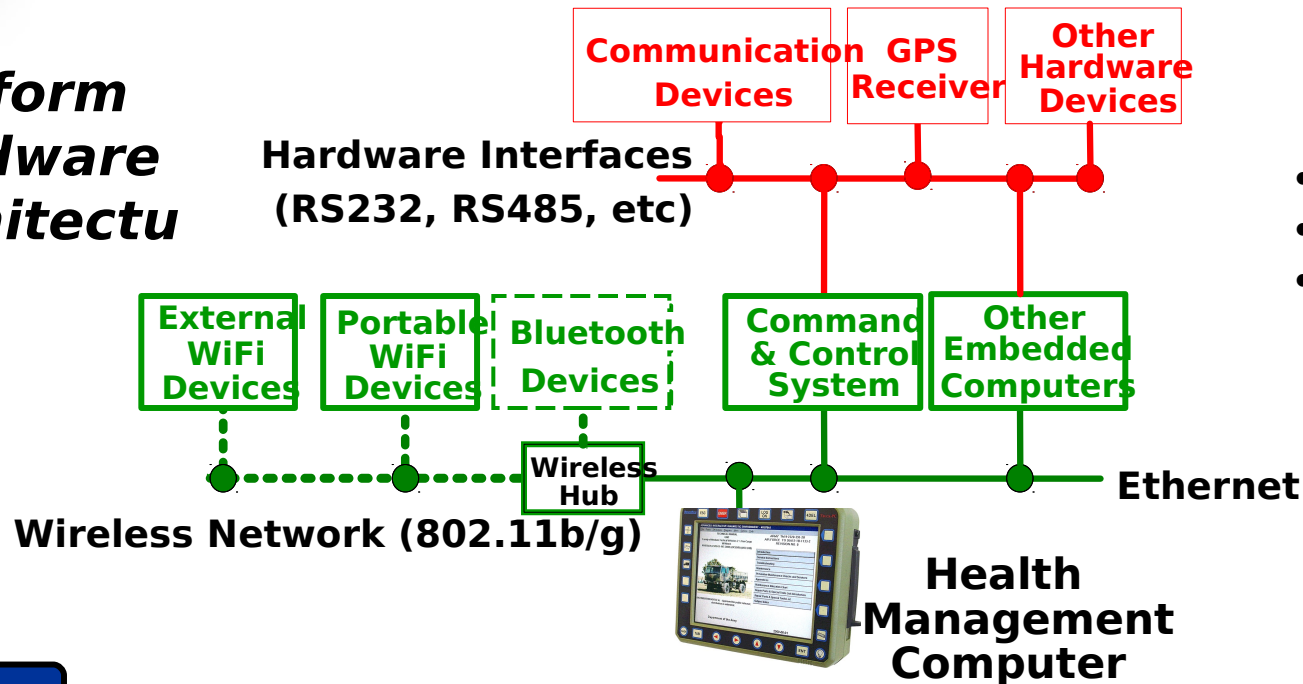




# System Architecture

## *Sensor-Based and Linked*

### Platform Hardware Architecture

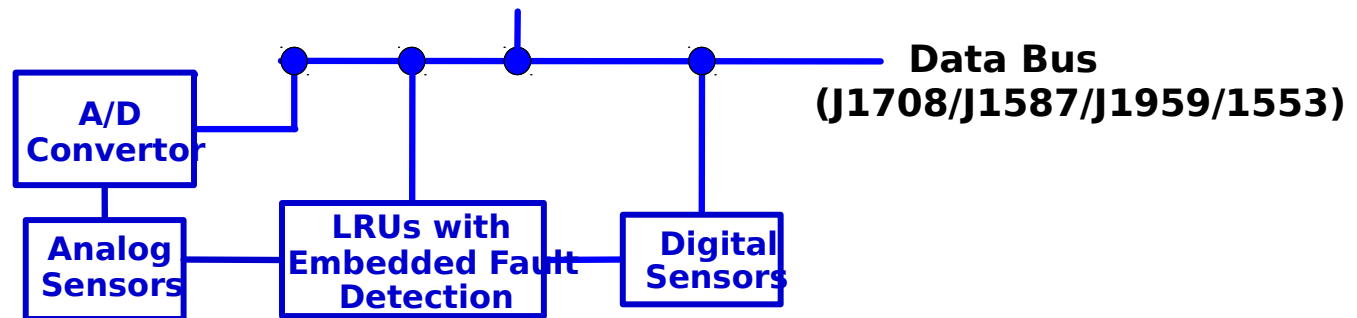


### Soldier

- Crew Health
- Supplies
- Soldier System Support

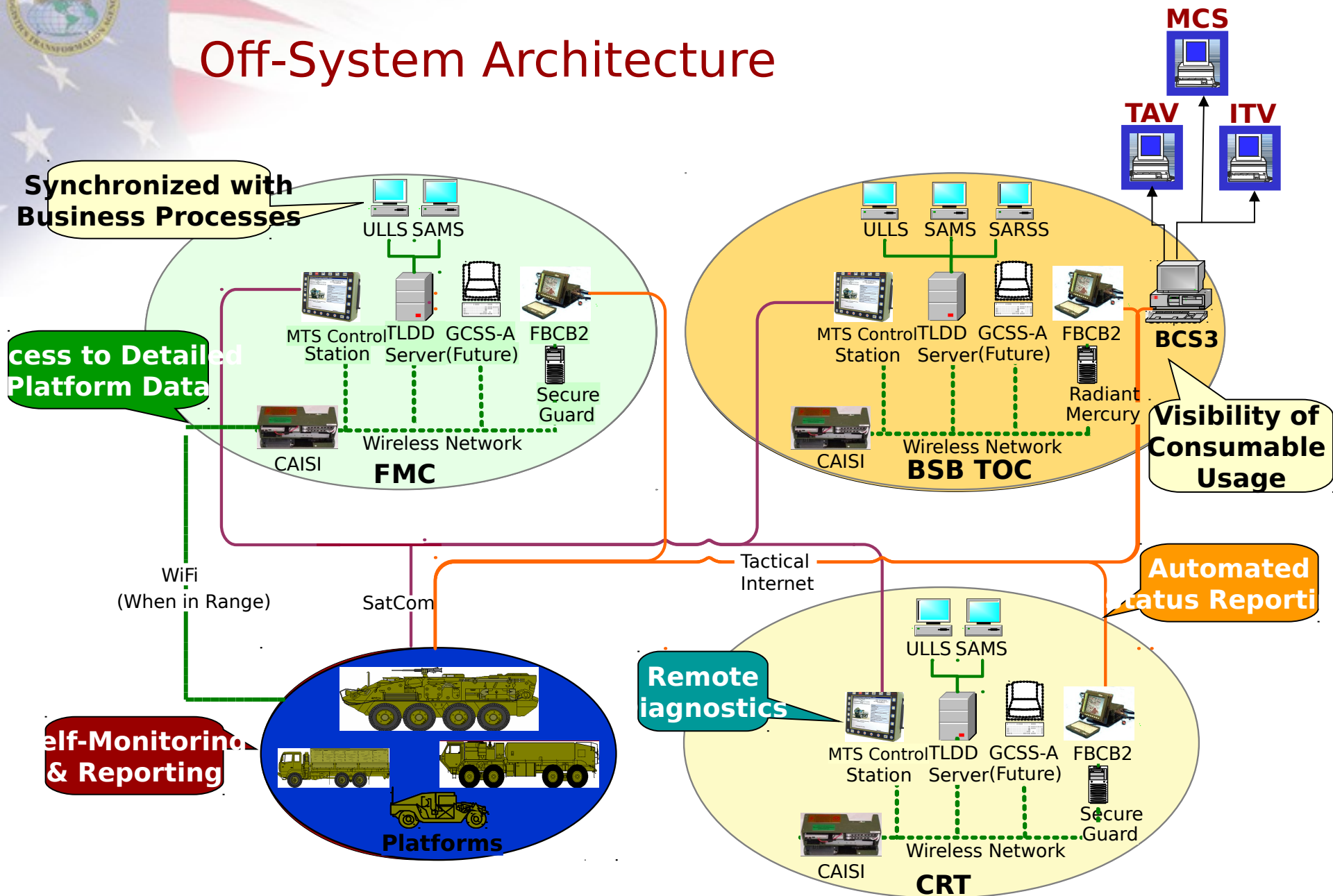
### Platform

- Monitors
- Detects
- Anticipates
- Reports





# Off-System Architecture

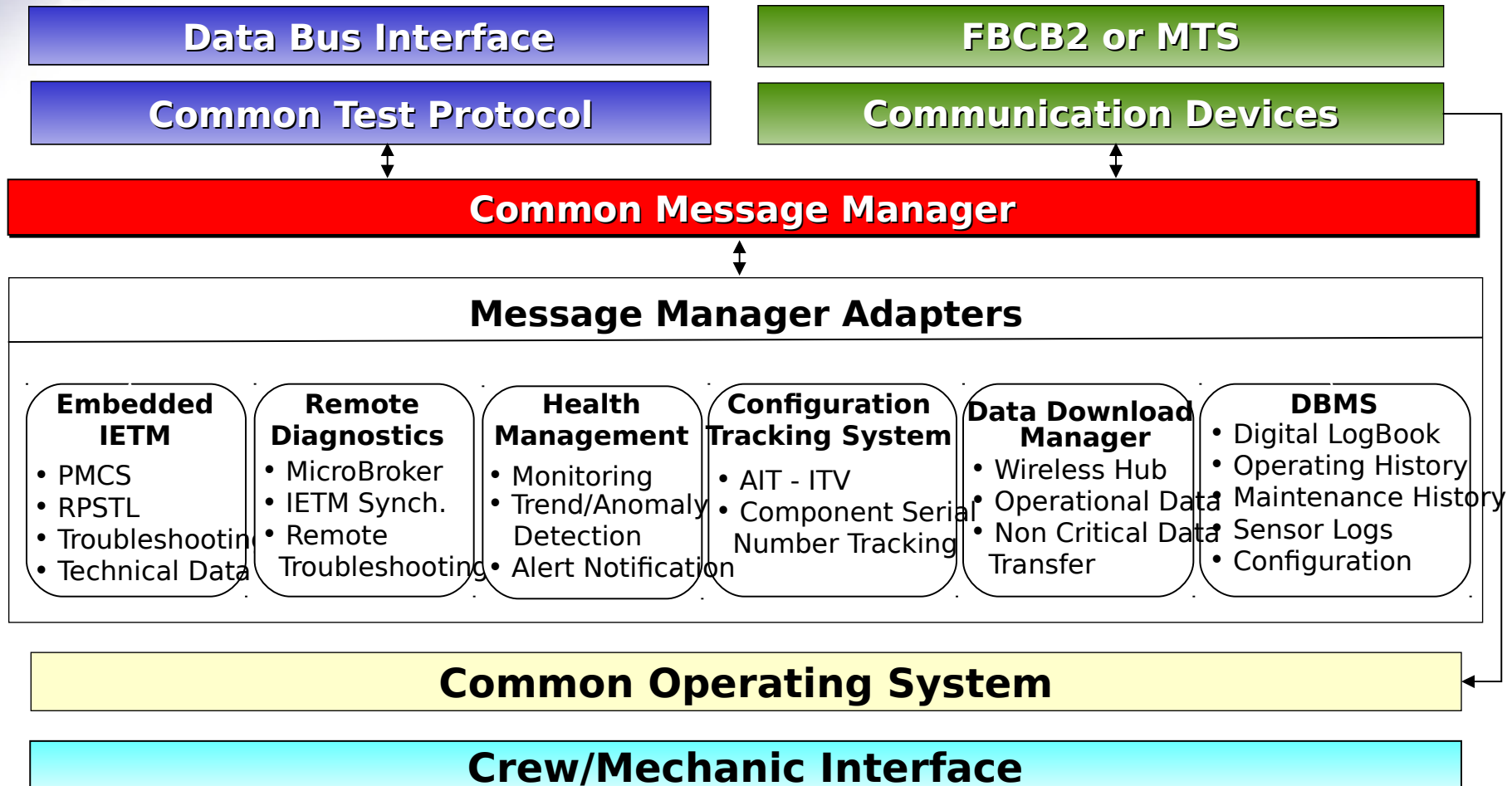






# System Software Architecture

## *Embedded Enablers*



UNCLASSIFIED

1600ZAPR2002

R

R

18

0

0

0

Grab

Zoom

View

Nav...

---

Ctrl

FIPR 0

Top...

\*\*\*\*\* U

10TET 32478 10802

F1

Map...

F2

Filters...

F3

Combat...

F4

Msgs...

F5

Status...

F6

Admin...

F7

Apps...

F8

Help

1x



16:00

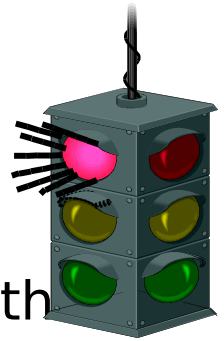
# Representative Sample

	Minimum	Average	Time
Fuel	21%	30%	141600ZAPR2002
Ammo (HE)	70%CL	75%CL	141600ZAPR2002
Ammo (AP)	60%CL	73%CL	141600ZAPR2002
Equip Health	82%	88%	141600ZAPR2002
Crew Health			141600ZAPR2002
Food	62%	70%	140400ZAPR2002
Water	72%	78%	140400ZAPR2002

F A E P O



## Thoughts to take away



- CLOE Is A Collaborative, Living Process That Works With Major Army Agencies, Organizations and Programs
- The CLOE Architecture is an evolving environment of systems integration and interoperability
- CLOE Is The Only Initiative That Addresses Big Picture Sustainment Interoperability Among Current and Future Forces With Respect to Condition-Based Maintenance and Anticipatory Logistics

***"The line between disorder and order lies in logistics..."***  
***- Sun Tzu***

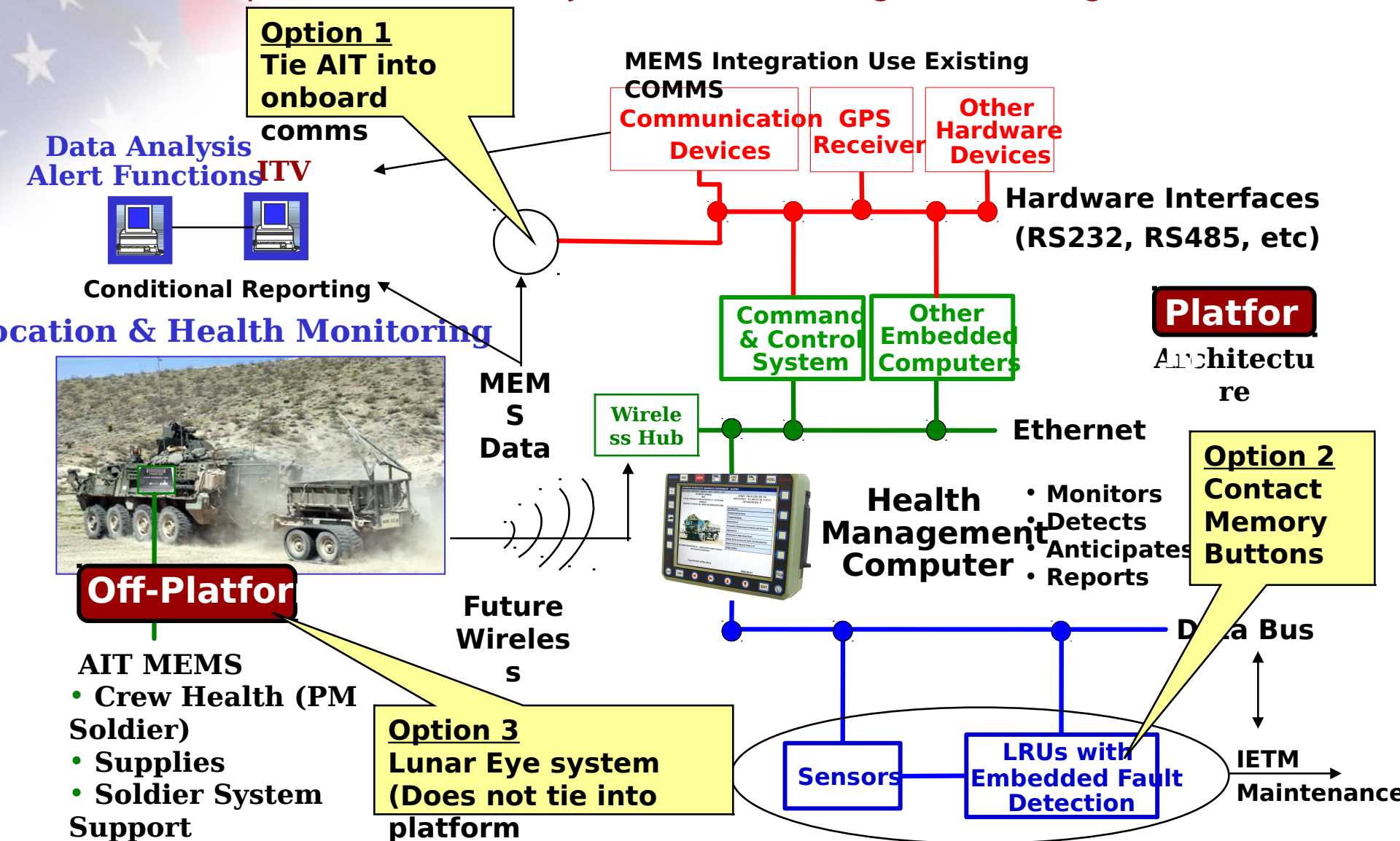


## Backup Slides



# AIT Integration

## Weapons Platforms Major End Items Diagnostics/Prognostics



Provide LRU History with MEMS and/or AIT Devices